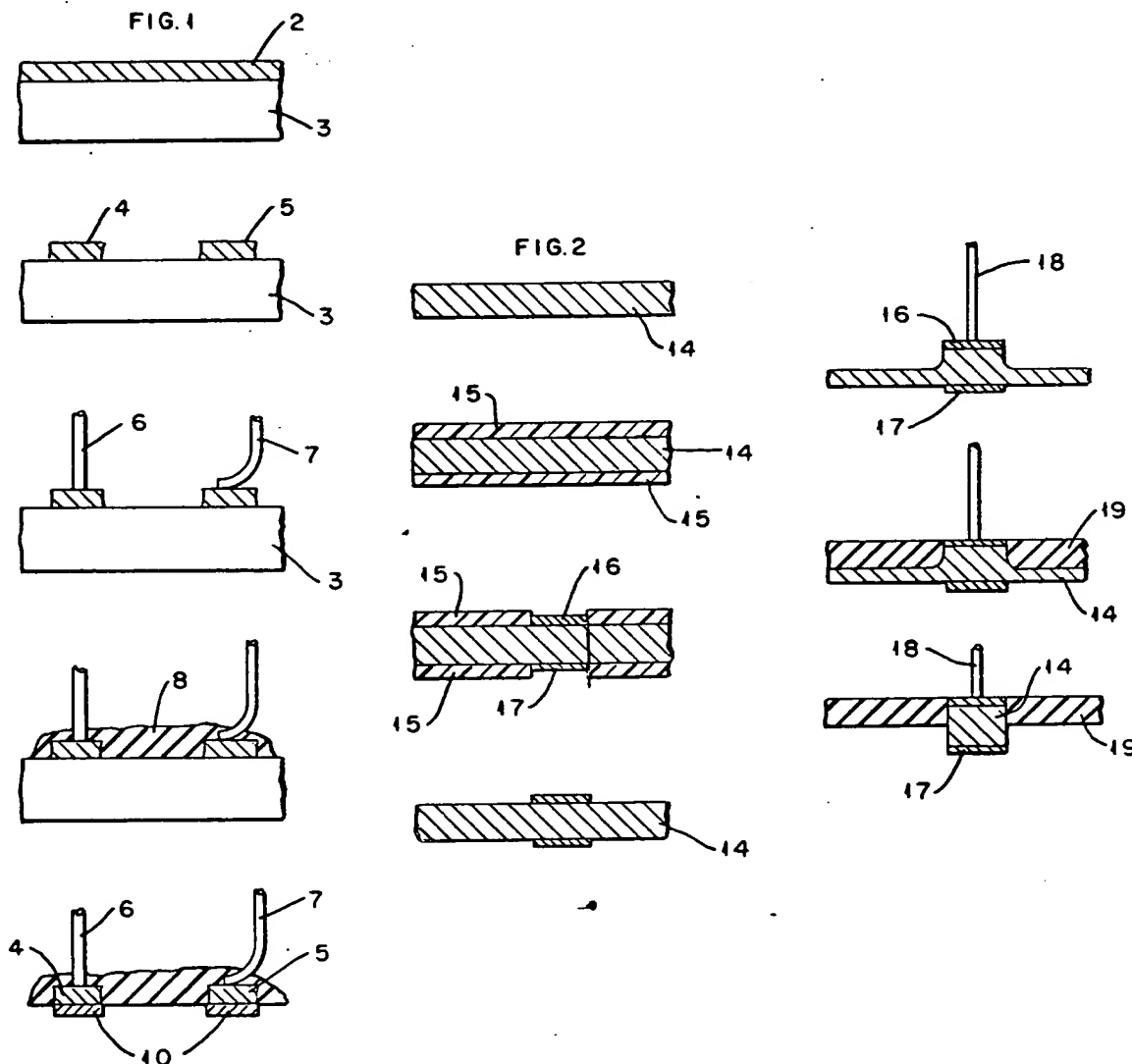


29/630

FLEXIBLE PROBE

B. Best, E. G. Loeffel, J. J. Pantaleo and A. W. Rzent



The drawing shows two methods of making electrical probes with a pattern of conductive pads formed on a flexible substrate. Probes of this type are useful for testing small components that have a large number of test points.

In the method of Fig. 1, a conductive foil layer 2 that is formed on a dissolvable substrate 3 is etched to form a pattern of discrete

USC 29-592

## FLEXIBLE PROBE - Continued

conductive pads 4 and 5. Wires 6 and 7 are attached to pads 4 and 5 by the butt or lap welds shown in the drawing, or other suitable means such as microbrazing. Alternatively, the wires may be electrically welded to the pad locations on foil 2 before the etch step, so that foil 2 forms a part of the welding circuit. After the pads have been etched and the wires have been attached, butyl or other flexible insulating material 8 is applied over the substrate. The pads 4 and 5 may be gold plated before the etch step, so that they tend to be undercut and thereby are locked into material 8. Substrate 3 is then removed. Bosses 10 can be formed by electroplating to a desired height.

In the method of Fig. 2, a conductive layer 14 is coated with an etch resist 15 on both surfaces and the resists are removed at locations where contact pads are to be formed. These regions are then plated with a suitable contact material and etch resist such as gold 16, 17. The resists are removed and a wire 18 is attached to each pad region on the upper surface of layer 14. The upper surface is then etched to the depth required for a flexible support. A flexible support 19 is then applied where regions of layer 14 were removed in the etch step. If desired, material 19 can extend over the surfaces of plated region 16. The lower surface of layer 14 is then etched to form discrete pads. If desired, additional material 19 may be applied in this region.

Alternatively, the contacts can be formed as a multilevel system of planar conductors leading to a set of pads on the periphery of the pattern, and the wires are welded only to the peripheral pads. The multilayer planar conductors are thin enough so that they do not limit the flexibility of the completed structure.